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Stylosanthes reduces weed infestation in upland rice cropping systems in the Mid-West of Madagascar

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In the Mid-West of Madagascar, upland rice is highly suffering from low soil fertility and weed pressure. Farmers cannot afford herbicides and rely entirely on a labour-intensive hand weeding. Recently, a no-till system with stylosanthes, a legume cover crop managed as living mulch, has been introduced. It has been proven to enhance soil fertility, but its effect on the weed community was not yet studied. This work aims at assessing the effect of stylosanthes on weed abundance, weed composition, and rice yield. Field experiments were conducted at Ivory station, Mid-West of Madagascar (19°33.29'S, 46° 24.913'E) in 2016 and 2017. Two factors were tested in a split-plot design with 6 replications: main plot factor was soil management (conventional tillage [CT] vs. no-till with stylosanthes [NT]), and sub plot factor was fertilization (manure [F1] vs. manure + NPK + urea [F2]). Weedy and weed-free plots were set up in each factor combination. Stylo-plots (rice and stylosanthes alone, weeds were removed) were set up only in NT, to test potential competition between stylosanthes and rice. Data collected were total weed cover at 60 DAS, rice yield and weed biomass at harvest (grass weeds, broadleaved and sedge separately). Fertilization did not significantly affect total weed cover. Total weed cover was around 65% lower in NT than in CT in both years. Weed biomass at harvest showed that this reduction was mainly due to a decline of grass weeds, as they were the most important functional group in all systems. In CT, rice yield losses due to weeds were around 50% and 85% respectively in 2016 and 2017 showing an important year effect. In NT, rice yield losses due to stylosanthes + weeds were around 50% in both years. Rice yield loss due to stylosanthes alone was not significant.